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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,953	10/23/2001	Lawrence E. Felton	2550/117	5466
2101	7590	06/01/2004	EXAMINER	
BROMBERG & SUNSTEIN LLP 125 SUMMER STREET BOSTON, MA 02110-1618			CULBERT, ROBERTS P	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 06/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/002,953		FELTON ET AL.	
	Examiner		Art Unit	
	Roberts Culbert		1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 13 and 14 is/are rejected.
- 7) ☒ Claim(s) 10-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>05/04</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's information disclosure statement filed on 4/22/04 has been considered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 13, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5668,033 to Ohara et al.

Regarding Claim 1, Ohara teaches a method for capping a Micro-Electromechanical System (MEMS) device, comprising: forming a cap structure (33) having a bottom side with at least a MEMS cavity, a cut capture cavity surrounding the MEMS cavity and a cap wall (23, and/or 24), the cap wall forming an outer wall of the MEMS cavity and an inner wall of the cut capture cavity; bonding the cap wall onto a MEMS structure (Fig 12); and cutting through to the cut capture cavity from a top side of the cap structure to form a cap. (Col. 9, Lines 7-11)

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Regarding Claim 2, Ohara teaches that forming the cap structure comprises forming the MEMS cavity and the cut capture cavity into the bottom side of the cap structure. (Fig 11.)

Regarding Claim 3, Ohara teaches that forming the MEMS cavity and the cut capture cavity into the bottom side of the cap structure comprises: etching the MEMS cavity and the cut capture cavity into the bottom side of the cap structure. (Col. 6, Lines 20-25)

Regarding Claim 4, Ohara teaches that forming the cap structure comprises forming the cap wall (24) onto the bottom side of the cap structure (Fig 11), the cap wall forming the outside wall of the MEMS cavity and the inside wall of the cut capture cavity.

Regarding Claim 5, Ohara teaches that forming the cap wall onto the bottom side of the cap structure comprises depositing a cap wall material (24) onto the bottom side of the cap structure to form the cap wall. (Col. 6, Lines 28-29)

Regarding Claim 6, Ohara teaches that bonding the cap wall onto the MEMS structure comprises: applying a bonding material (24) to a bottom side of the cap wall; (Col. 6, Lines 28-30) and bonding the bottom side of the cap wall onto the MEMS structure. (Col. 7, Lines 34-45)

Regarding Claim 13, Ohara teaches cutting through to the cut capture cavity from the top side of the cap structure to form the cap using a precision cutting technique. (Col. 9, Lines 7-64) Note that other dicing methods such as etching and laser ablation are well known in the art.

Regarding Claim 14, Ohara teaches that the cap structure (33) comprises a silicon material. (Col. 6, Line 20)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5668,033 to Ohara et al. as applied above, and in further view of EP 1096564 A1 to Denton et al.

As applied above, Ohara teaches the method of the invention substantially as claimed, but does not teach bonding the cap wall to the MEMS structure using a glass frit material.

Regarding Claim 7, Denton et al. teaches a method of capping a MEMS device comprising bonding a silicon wafer cap to a semiconductor substrate using a glass frit material.

It would have been obvious to one of ordinary skill in the art at the time of invention to use frit glass bonding material in place of the gold film material of Ohara to bond the cap to the MEMS structure since Denton et al. teaches that frit glass and gold are equivalent for this purpose. See (Col. 3, Lines 9-10) of Denton et al.

Regarding Claim 8, Denton et al. teaches that applying the bonding material to the bottom side of the cap wall comprises: screen printing a glass frit material onto the bottom side of the cap wall; (Col. 2, Lines 50-52) burning off organic compounds of the glass frit material; (Col. 2, Lines 55-56) and glazing the remaining glass frit material to form the glass material. (Col. 2, Line 56- Col. 3, Line 2)

Regarding Claim 9, Denton et al. teaches that bonding the bottom side of the cap wall onto the MEMS structure comprises: bonding the bottom side of the cap wall onto the MEMS structure under pressure at a temperature sufficient to melt (flow) the glass material. (Note that heat and contact pressure are sufficient to cause the frit glass to flow. (Col. 2, Line 56- Col. 3, Line 2)

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Allowable Subject Matter

Claims 10-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571) 272-1433. The examiner can normally be reached on Monday-Friday (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

R. Culbert



GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700